

## ORIGINAL ARTICLE

# Determinants of Suicidal Ideation in Taiwanese Urban Adolescents

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**Background/Purpose:** The primary purpose of this study was to examine the determinants of adolescent suicidal ideation in Taiwanese urban adolescents.

**Methods:** A descriptive and correlational study design was used. A sample of 2341 adolescents aged from 12 to 18 years in middle and high school was recruited for this study. Data were collected between January 2005 and July 2007. Instruments used included the Children's Depression Inventory, the Cognitive Triad for Children, the Positive and Negative Suicide Ideation, the Life Event Checklist, and the revised Daily Hassle Scale.

**Results:** Approximately 51% of the adolescents were identified as belonging to the high-risk group and needed further assessment for at-risk suicidal ideation. Specifically, 51.6% and 50.7% of the adolescents in middle and high schools, respectively, were identified as belonging to the high-risk groups. Results revealed that type of school, depressive symptoms, cognitive triad, and daily hassles significantly predicted adolescent suicidal ideation. Middle school students were likely to report a greater amount of suicidal ideation. Students with higher levels of depressive symptoms, negative cognitive triad and daily hassles tended to have more suicidal thoughts. The best predictor was the negative cognitive triad ( $\beta = -0.43$ ,  $p < 0.001$ ) followed by depressive symptoms ( $\beta = 0.35$ ,  $p < 0.001$ ).

**Conclusion:** Results from this study have important implications for identifying high-risk suicidal adolescent groups and for furthering suicide prevention work. [*J Formos Med Assoc* 2008;107(2):156–164]

**Key Words:** adolescents, determinants, suicidal ideation

Youth suicide is one of the most serious mental health, social and economic problems, and it continues to be an important public health problem in Taiwan. During the past 10 years, suicide has ranked as the second or third leading cause of death among youths aged 15–24 years in Taiwan.<sup>1</sup> Similarly, suicide is the third leading cause of death among youths aged 10–24 years in the US.<sup>2</sup> Although the prevalence of suicide is quite low

among children aged 10–14 years, a dramatic increase has been noticed with a 120% increase in the US between 1980 and 1992.<sup>3</sup>

The prevalence of suicidal ideation in community-based adolescents is not rare. Kann et al<sup>4</sup> found that about 24.1% and 19% of youth had experienced suicidal ideation and had made specific plans to attempt suicide respectively during the 12 months preceding the investigation.

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Studies have also found that the prevalence of suicidal ideation in youth ranged between 2% and 60%.<sup>5</sup> The suicidal ideation rate in adolescents ranged from 10% to 36% in Taiwan.<sup>6</sup> Hatcher-Kay and King indicated that most youth suicide attempters report a history of suicidal ideation.<sup>7</sup> Suicide is considered as the completed process of a continuum that begins with suicidal ideation, followed by attempted suicide and finally completed suicide.<sup>8</sup> Recent longitudinal study has evaluated the long-term effect of suicidal ideation in a community sample of adolescents at age 15.<sup>9</sup> Multiple outcomes were then compared at age 30 for those participants who reported suicidal ideation at age 15 and those who did not. Results showed that subjects with suicidal ideation at age 15 were more likely to have axis I disorders, attempted suicide, more problem behaviors and poorer overall functioning at age 30. The identification of determinants of youth suicidal ideation is therefore an important component of suicide prevention work.

Empirical theories and studies implicate a range of antecedent risk factors in adolescent suicidal ideation. The occurrence of suicidal ideation is associated with age, gender, school grade, academic stress, and parents' marital status. Studies using a developmental view examining age-related trends in suicidal ideation from early adolescence through young adulthood ideation have found that suicidal ideation increases during early adolescence and peaks during mid-adolescence which is approximately 14–15 years old.<sup>10,11</sup> Suicidal ideation is twice as prevalent in girls than in boys.<sup>11</sup> One study found that students in the 12<sup>th</sup> grade of high school reported a significantly higher rate of suicidal ideation than students in the 10<sup>th</sup> and 11<sup>th</sup> grades and in the 7<sup>th</sup> grade of middle school.<sup>12</sup> Academic stressors have comprised the major stressor in Taiwan. Poor grades, increased academic stress<sup>13</sup> and hopelessness due to dissatisfaction with academic grades<sup>14</sup> were found to be related to adolescent suicidal ideation. A study indicated that parents' separation and divorce can cause suicidal attempts in adolescents.<sup>15</sup>

The cognitive theory of suicide<sup>16</sup> proposes that cognition is the key element in suicidality. Studies have found that distorted cognition and levels of depression are related to suicidal ideation.<sup>17,18</sup> In Western countries, approximately 15% of depressed adolescents have experienced suicidal ideation, with 5% of them actually engaging in suicidal behaviors.

Researchers have indicated that adolescents exposed to stress have associated severe emotional and psychologic problems,<sup>19</sup> and this is a common precursor to suicide.<sup>20</sup> Boekaerts proposed two types of stressors in adolescence: life events and daily hassles.<sup>21</sup> Empirical studies found that college students with suicidal ideation experienced more life events than college students without suicidal ideation.<sup>22</sup> Chang found that high school and college students experienced more daily hassles and had higher levels of depressive symptoms and suicidal ideation.<sup>23</sup> However, few studies have examined the effect of both life events and daily hassles on adolescent suicidality.

Most researchers who have investigated youth suicidality in Taiwan recruited a single sample, either middle or high school students. It is difficult to identify target populations for prevention efforts. The purpose of this study was to explore risk factors for suicidal ideation in both middle and high schools students in order to better focus primary prevention work on target populations.

## Methods

### *Research design and participants*

Data were from a large cross-sectional and correlational design obtained from a community-based sample of adolescents (aged 12–18 years) between January 2005 and July 2007. Participants were selected from middle and high schools in Taipei, Taiwan, for this study. Initially, 15 schools, including seven middle schools and eight high schools, were randomly selected from a list of middle and high schools in four districts of Taipei City. From these 15 schools, a random sampling method was then used to select two classes in each

grade. For some schools, it was not convenient for them to grant permission to randomly select classes; convenient classes were therefore selected by the teachers. The inclusion criteria in this study were: (1) 12–18 years of age and (2) able to read, write and speak Mandarin Chinese.

### Data collection

Approval for the study was obtained from the Institutional Review Board of the Human Subject Committee of Taipei Medical University. Written informed consents were obtained from the students and their parents. Anonymous instruments were only distributed to those students with valid signed consent forms. A small gift was given to the students upon completion of the instruments. The students were assured that study response and data management would be confidential.

### Measures

#### *Children's Depression Inventory (CDI)*

The CDI<sup>24</sup> is designed to measure the severity of adolescent depressive symptoms in 7–17-year-olds. The possible range of the total score is 0–54 points, with a higher score indicating more severe depression. The Chinese version of the CDI has been shown to have satisfactory internal consistency (Cronbach's  $\alpha$ , 0.88) and test–retest reliability ( $r=0.85$ ).<sup>25</sup> The internal consistency coefficient for the Chinese version was 0.89 in this study. Significant relationships with suicidal ideation (0.69) and the cognitive triad (–0.71) demonstrated evidence of construct validity.

#### *Cognitive Triad for Children (CTI-C)*

The 36-item CTI-C<sup>26</sup> is designed to measure an adolescent's cognitive triad, which reflects one's view of self, the world and the future. The total score of the CTI-C ranges from 0 to 72, with a higher score representing more positive thought patterns. In this study, Cronbach's  $\alpha$  coefficient for the Chinese version was 0.89. Significant correlations with depressive symptoms (–0.77) and learned resourcefulness (0.55) demonstrated evidence of construct validity.

#### *Positive and Negative Suicide Ideation (PANSI)*

PANSI<sup>27</sup> is a 14-item self-reported instrument designed to measure suicidal ideation, which is composed of two factors: Positive Ideation (PANSI-PI; six items) and Negative Suicidal Ideation (PANSI-NSI; eight items). The possible range of the total score is 0–70 points, with a higher score on the PANSI-PI and PANSI-NSI representing more positive ideation and more negative suicide ideation, respectively. Cronbach's  $\alpha$  coefficient for the Chinese version was 0.90 in this study. The test–retest coefficient was 0.38 ( $p<0.05$ ). Criterion-related validity was evidenced by significantly different mean scores between community- and clinical-based adolescents. Consistent with Osman et al's finding, a two-factor structure was also found based on the confirmatory factor analysis.<sup>27</sup> Significant correlations with depressive symptoms (0.69) and learned resourcefulness (–0.46) demonstrated evidence of construct validity. Using attempted suicide behavior as the gold standard, receiver operating characteristics analysis suggested that a cut-off value of  $\geq 8.5$  on the PANSI-NSI had the highest rates of sensitivity (88.0) and specificity (55.6).

#### *Life Events Checklist (LEC)*

The LEC was designed by Johnson and McCutcheon.<sup>28</sup> The instrument contains 46 major life events that are frequently experienced by older children and adolescents. In this study, three items were added based on cultural considerations: "take classes after school", "own a personal cell phone", and "have been punished by the school". The test–retest reliability coefficients of the Chinese version were between 0.65 and 0.86.<sup>29</sup> Cronbach's  $\alpha$  coefficient was 0.83 for this study. Significant relationships with depressive symptoms (0.19), the cognitive triad (–0.13) and daily hassles (0.35) demonstrated evidence of construct validity.

#### *Daily Hassles Scale-Revised (DHS-R)*

The DHS-R was developed from the Daily Hassles Scale<sup>22</sup> and the Hassle Scale.<sup>30</sup> The DHS-R requires respondents to rate the frequency and

severity of each of 73 hassle events that occurred during the past month. Internal consistency analyses revealed a sufficient Cronbach's  $\alpha$  coefficient of 0.93. Significant relationships with depressive symptoms (0.53), the cognitive triad (-0.42) and life events (0.35) demonstrated evidence of construct validity.

### **Data analysis**

SPSS/PC version 15.0 (SPSS Inc., Chicago, IL, USA) for Windows was used for this study's data analyses. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to describe demographic characteristics. Cronbach's  $\alpha$  coefficient was used to describe internal consistency for each study instrument. Independent sample *t* test and ANOVA were used to examine differences in suicidal ideation among the demographic groups. Pearson's *r* correlation was used to examine the interrelationships among the study variables. Multiple regression analysis was used to examine the determinants of suicidal ideation. The independent variables included gender, types of school, satisfaction in academic performance, parental marital status, depressive symptoms, cognitive triad, daily hassles, and life events.

## **Results**

### **Demographic characteristics**

A sample of 2498 community-based adolescents anonymously filled out the questionnaires. Although 2365 (94.68%) students returned the questionnaires, only 2341 of them completed all the questions. The actual response rate was approximately 93.71%. The power was set to 0.95 in order to justify the large sample size and conduct power analysis. It was found that the sample was still far beyond the recommended sample size of 166.

The sample included 1222 (52.2%) male students and 1119 (47.8%) female students. Their ages ranged from 12 to 18 years, with a mean of  $15.16 \pm 1.58$  years. Approximately 53% ( $n = 1240$ )

and 47% ( $n = 1101$ ) of the students were in middle and high school, respectively. The majority of these students had an intact family (80.8%), while 17.1% of them lived in a family in which the parents were separated or divorced, or one or both had died. Most of the students reported that their parents had graduated from high school. Most students (41.1%) reported that the level of satisfaction with their academic performance was average.

Independent sample *t* test and ANOVA were used to examine differences in suicidal ideation among the demographic groups (Table 1). Results revealed that suicidal ideation did not differ between girls and boys but significantly differed among age groups ( $F = 5.48, p < 0.001$ ). Adolescents who were aged 13–14 reported higher scores of suicidal ideation than other age groups. Students in the seventh and eighth grades reported higher scores of suicidal ideation than those of other grades ( $F = 6.88, p < 0.001$ ). Overall, students in middle school reported higher scores of suicidal ideation than those in high school ( $t = 5.38, p < 0.001$ ). Scores on suicidal ideation were also different for different levels of satisfaction with academic performance ( $F = 58.87, p < 0.001$ ). Students who reported being dissatisfied with their academic performance had higher scores for suicidal ideation. Students from families with divorced parents had the highest scores for suicidal ideation ( $F = 3.47, p < 0.01$ ) (Table 1).

### **Correlations among study variables**

Pearson's *r* was used to examine correlations among major study variables (Table 2). Results revealed that major study variables were significantly related to each other. Specifically, adolescent suicidal ideation was significantly related to depressive symptoms, the cognitive triad, life events, and daily hassles. A higher level of suicidal ideation was negatively and significantly related to a positive cognitive triad (-0.71). Suicidal ideation was significantly and positively related to depressive symptoms (0.69), life events (0.10), and daily hassles (0.38).

**Table 1.** Differences in suicidal ideation among demographic groups

	Frequency	Percentage	Mean (SD)	$t^*/F^\dagger$ value
Age (yr)				5.48 <sup>†‡</sup>
12	52	2.4	25.94 (9.08)	
13	337	15.6	29.92 (10.94)	
14	479	22.1	29.40 (9.13)	
15	297	13.7	27.90 (9.42)	
16	426	19.7	27.68 (9.11)	
17	500	23.1	27.02 (8.00)	
18	76	3.5	28.99 (8.28)	
Mean (SD)	15.16 (1.58)			
Gender				-1.21*
Boy	1222	52.2	28.13 (9.23)	
Girl	1119	47.8	28.60 (9.35)	
Grade				6.88 <sup>†‡</sup>
7	413	17.6	29.35 (10.24)	
8	531	22.7	29.50 (9.85)	
9	296	12.6	28.96 (9.52)	
10	452	19.3	27.44 (8.76)	
11	438	18.7	26.59 (8.24)	
12	211	9.0	28.34 (8.07)	
School				5.38 <sup>*‡</sup>
Middle	1240	53.0	29.32 (9.90)	
High	1101	47.0	27.27 (8.44)	
Satisfaction with grades				58.87 <sup>†‡</sup>
Satisfied	412	18.9	24.84 (8.55)	
Average	895	41.1	27.72 (8.14)	
Dissatisfied	873	40.0	30.57 (10.15)	
Parental marital status				3.47 <sup>†§</sup>
Intact family	1746	80.8	27.90 (8.93)	
Separated	84	3.9	29.21 (9.09)	
Divorced	214	9.9	30.76 (10.86)	
Father died	61	2.8	27.28 (9.50)	
Mother died	11	0.5	29.18 (10.81)	
Other	45	2.1	29.50 (11.71)	

\* $t$  test;  $^\dagger$ ANOVA;  $^\ddagger p < 0.001$ ;  $^\S p < 0.01$ . SD = standard deviation.

### ***Prevalence and determinants of adolescent suicidal ideation***

Using PANSI-NSI 8.5 as the cut-off point, 1155 (51.2%) adolescents were identified as belonging to the high-risk group and needed further assessment for at-risk suicidal ideation. Specifically, 611 (51.6%) middle school students and 544 (50.7%) high school students were identified as belonging to the high-risk group. Since study variables were

significantly related to each other, multicollinearity may be a problem in this study that indicates redundant variables provide similar information and result in problematic results.<sup>31</sup> Multicollinearity is when variables are highly correlated ( $\geq 0.85$ ).<sup>31</sup> To identify multicollinearity, the following criteria were used: pair-wise relationships, tolerance of variable, and variance inflation factor (VIF). Pearson's  $r$  correlations among the major

**Table 2.** Intercorrelations among major study variables

	1	2	3	4	5
1. Suicidal ideation	1				
2. Depressive symptoms	0.69*	1			
3. Cognitive triad	-0.71*	-0.77*	1		
4. Daily hassles	0.38*	0.53*	-0.42*	1	
5. Life events	0.10*	0.19*	-0.13*	0.35*	1
Mean	28.35	13.91	46.02	36.84	7.46
SD	9.29	7.77	10.83	31.32	4.49
Cronbach's $\alpha$	0.90	0.89	0.89	0.93	0.83

\* $p < 0.001$ . SD = standard deviation.

**Table 3.** Determinants of suicidal ideation

	B	SE	$\beta$	$t$	$R^2$	$F$
Gender	0.46	0.27	0.03	1.72	0.57	358.31*
School	-2.15	0.28	-0.12	-7.78*		
Satisfaction with academic performance	-0.04	0.14	-0.004	-0.28		
Parental marital status	0.07	0.12	0.008	0.56		
Depressive symptoms	0.42	0.03	0.35	13.91*		
Cognitive triad	-0.36	0.02	-0.43	-18.11*		
Daily hassles	0.01	0.005	0.05	2.57 <sup>†</sup>		
Life events	-0.005	0.03	-0.02	-1.46		

\* $p < 0.001$ ; <sup>†</sup> $p < 0.05$ . SE = standard error.

study variables ranged from 0.10 to -0.77, which were lower than the suggested value |0.80|. A value of tolerance close to zero indicates that the variables are multicollinear. The tolerance values for the major study variables ranged from 0.32 to 0.97. Furthermore, a value of VIF > 10 indicates a problem with multicollinearity. The values of VIF for the variables ranged from 1.03 to 3.09. Based on the above results, multicollinearity was not a concern in this study.

Multiple regression analysis was then used to examine the determinants of adolescent suicidal ideation. The independent variables included gender, type of school, satisfaction with academic performance, parental marital status, depressive symptoms, the cognitive triad, life events, and daily hassles. The dependent variable was the total score for suicidal ideation. It was found that type of school, depressive symptoms, the cognitive triad and daily hassles significantly predicted adolescent suicidal ideation. Middle school students

were more likely to report suicidal ideation. Students with higher levels of depressive symptoms, the negative cognitive triad and daily hassles tended to have more suicidal thoughts. The best predictor was the negative cognitive triad ( $\beta = -0.43$ ,  $p < 0.001$ ), followed by depressive symptoms ( $\beta = 0.35$ ,  $p < 0.001$ ) (Table 3).

## Discussion

Community-based adolescents suffer from high risks of suicidal ideation. This study found that 51.2% of the adolescents reported suicidal ideation, which is similar to a previous study.<sup>32</sup> This may be due to impacts from dramatic changes in biopsychosocial aspects. The influence of the media on an adolescent's attitudes toward suicide may be another reason for the high prevalence of suicidal ideation. Adolescents who receive media reports about suicide may think suicide to



be a brave behavior and problem-solving strategy. Stein et al<sup>33</sup> found that 50% of adolescents did not think that suicide is a shameful behavior. Approximately two-thirds of adolescents considered suicide to be acceptable under specific circumstances. Consistent with a previous study, the present study found that adolescent suicidal ideation significantly differed among age groups, types of school, grades, parental marital status, and satisfaction with grades. Although adolescent girls reported higher scores for suicidal ideation than boys, the difference did not reach statistical significance. Adolescent girls often experienced higher levels of emotional stress which might lead to suicidal behaviors.<sup>34</sup> Similar to this study, however, a previous study also found that gender difference in suicidal ideation was not significant.<sup>35</sup>

This study found that middle school students experienced higher levels of suicidal ideation than high school students. This result is consistent with those from Western countries.<sup>10,11</sup> Adolescents who are in middle school are in early and middle adolescence. Children entering adolescence who are already psychologically or socially vulnerable are likely to experience a more difficult adolescent decade under challenging social circumstances.<sup>36</sup> Adolescence is a period of transition characterized by accelerated processes of changes in cognition and social and psychologic functioning, accompanied by apparent physical restructuring. This is a unique developmental period in which the individual is confronted with a series of complex and interrelated changes and events that have to be mastered. Rutter indicated that emotional turmoil and disturbances occur in early adolescence.<sup>37</sup> Therefore, suicidal ideation may concomitantly increase in this stage. Although this study found that adolescent suicidal ideation was significantly different among subgroups in age, grade, types of school, satisfaction with academic performance and parental marital status, the mean differences were not high. Because of the large sample size used in this study, the generalizability of the results will need to be further assessed.

Depressive symptoms and the cognitive triad were found to predict adolescent suicidal ideation in this study. Previous empirical studies consistently found a strong relationship between depression and suicidal behaviors in adolescents.<sup>18,38</sup> Abramson et al also found that college students with high cognitive risk were more likely to report greater suicidal ideation than students with low cognitive risk.<sup>17</sup> Despite researchers suggesting that two stressors, major life events and minor daily hassles, were equally important for predicting adolescent mental health, this study found that only daily hassles were related to adolescent suicidal ideation. Although daily hassles are far less dramatic than major changes in life, they may be even more important in adaptation and health.<sup>39,40</sup> Lazarus and Folkman found that hassles are far superior to life events in predicting psychologic and somatic symptoms.<sup>41</sup> Hassles accounted for almost all the outcome variance attributable to life events, whereas life events had little or no impact on health outcomes independent of daily hassles.<sup>39,40</sup> Relatively few studies have examined the effect of daily hassles on adolescent suicidal ideation. The results from this study have important implications for assessing stressors including both life events and daily hassles in order to reduce adolescent suicidal ideation.

Including the type of school and more comprehensive factors related to suicidal ideation is crucial for developing intervention strategies that reduce suicidal ideation in school-aged adolescents. The study results may have implications for developing health policies related to the development of educational programs within schools that go beyond the basic curriculum and include cognitive and stress management strategies for suicide prevention. However, this study was limited by the use of a cross-sectional design and by sampling urban adolescents only. The influence of the significant predictors of suicidal ideation implies that the causality needs to be explored further using longitudinal and prospective designs. In future studies, a more heterogeneous and national sample needs to be included.

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